Atty. Docket No. 201-0699

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Art Unit	:	3661
Examiner	:	Olga Hernandez
Applicant	:	Erik Coelingh et al.
Appln. No.	:	10/063,953
Filing Date	:	May 29, 2002
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For	:	COMPLETE VEHICLE CONTROL

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPELLANTS' BRIEF (37 CFR §1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on February 10, 2004.

The fees required under §1.17(f), and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 CFR §1.192(a)).

This brief contains these items under the following headings, and in the order set forth below (37 CFR §1.192(c)):

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The final page of this brief bears the attorney's signature.

7. FEE DEFICIENCY

_x_ If any additional extension and/or fee is required, this is a request therefor and to charge Account No. 06 1510.

and/or

_x_ If any additional fee for claims is required, charge Account No. 06 1510.

Respectfully submitted,

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TABLE OF AUTHORITY

Case Authority

I. Real Party in Interest

The real party in interest in this application is Ford Global Technologies, LLC, which received an assignment from Ford Motor Company. The inventors in this application assigned their interest to Ford Motor Company.

II. Related Appeals and Interferences

U.S. Patent Application No. 10/063,951, which was filed on May 29, 2002, which includes the same disclosure as the present application and which has been assigned to Ford Global Technologies, LLC, currently is under Appeal to the Board of Patent Appeals and Interferences after a final rejection.

III. Status of Claims

Claims 1-22 are pending in this application. Claims 2-5, 9-12 and 16-20 have been indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As discussed below, an Amendment After Appeal is being filed contemporaneously with this Appeal Brief wherein claims 2, 4, 5, 9, 11, 12 and 16 were rewritten into independent form. Claims 3, 10 and 17-20 depend from claims 2, 9 and 16, respectively. Claims 1, 6-8, 13-15, 21 and 22 are the subject of this appeal. All appealed claims are finally rejected.

IV. Status of Amendments

An Amendment After Appeal is being filed contemporaneously with this Appeal Brief. The Amendment After Appeal only rewrites claims 2, 4, 5, 9, 11, 12 and 16 into independent form as these claims have been indicated as being in condition for allowance if rewritten into independent form.

V. Summary of the Invention

As described in the specification portion of the application (pages 1-25), and illustrated in the related figures (Figs. 1-7), the invention recited in the finally rejected claims relates to a vehicle control.

A first aspect of the present invention is to provide a method of controlling a vehicle comprising inputting an intended driving demand 14 to a vehicle motion control subsystem 12, with the intended driving demand 14 requesting a vehicle behavior modification. The method also includes providing a plurality of coordinator subsystems 16 and providing at least one actuator control subsystem 26 for each coordinator subsystem 16. The method further includes outputting actuator capabilities of the at least one actuator control subsystem 26 to an associated one of the plurality of coordinator subsystems 16 and outputting coordinator capabilities of each coordinator subsystem 16 to the vehicle motion control subsystem 12. Furthermore, the method includes calculating at least one coordinator demand signal with the vehicle motion control subsystem 12, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand 14. The method also includes outputting the at least one coordinator demand signal to at least one of the coordinator subsystems 16. The method further includes calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems 16, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems 16. Furthermore, the method includes outputting the at least one actuator demand signal to the at least one actuator control subsystem 26. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem 26 to perform the vehicle behavior modification of the intended driving demand 14 (see the present specification, paragraphs 22-25 and 41-48).

Another aspect of the present invention includes providing a vehicle control system comprising a vehicle motion control subsystem 12 having a control input and a control output, with the control input communicating an intended driving demand 14 to the vehicle motion

control subsystem 12, the intended driving demand 14 requesting a vehicle behavior modification. The vehicle control system also includes a plurality of coordinator subsystems 16, with each coordinator subsystem 16 including a coordinator input and a coordinator output, and with each coordinator subsystem 16 communicating coordinator capabilities of the coordinator subsystem 16 to the system input of the vehicle motion control subsystem 12. The vehicle control system further includes at least one actuator control subsystem 26 for each coordinator subsystem 16, with each actuator control subsystem 26 having an actuator output communicating actuator capabilities of the actuator control subsystem 26 to the coordinator input of an associated one of the plurality of coordinator subsystems 16. The vehicle motion control subsystem 12 calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand 14. The vehicle motion control subsystem 12 outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems 16. Each coordinator subsystem 16 calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems 16. Each coordinator subsystem 16 outputs the at least one actuator demand signal to at least one actuator control subsystem 26. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem 26 to perform the vehicle behavior modification of the intended driving demand 14 (see the present specification, paragraphs 22-25 and 41-48).

Yet another aspect of the present invention is to provide a method of controlling a vehicle comprising receiving at least one driver input from a driver 11 of the vehicle and providing at least one active assist program having at least one active input, with the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input. The method further includes inputting an intended driving demand 14 for implementing a vehicle behavior modification into a vehicle motion

control subsystem 12, proving an implementation subsystem, and outputting at least a portion of the intended driving demand 14 from the vehicle motion control subsystem 12 to the implementation subsystem. The intended driving demand 14 is derived from a combination of the at least one driver input and the at least one active input if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program, otherwise the intended driving demand 14 is derived from the at least one driver input (see the present specification, paragraphs 19-21 and 36-40).

Another aspect of the present invention is to provide a method of controlling a vehicle comprising inputting an intended driving demand 14 to a vehicle motion control subsystem 12, with the intended driving demand 14 requesting a vehicle behavior modification. The method also includes providing a plurality of coordinator subsystems 16 and providing at least one actuator control subsystem 26 for each coordinator subsystem 16. The method further includes outputting information concerning actuator limitations of the at least one actuator control subsystem 26 to an associated one of the plurality of coordinator subsystems 16 and outputting information concerning coordinator limitations of each coordinator subsystem 16 to the vehicle motion control subsystem 12. Furthermore, the method includes calculating at least one coordinator demand signal with the vehicle motion control subsystem 12, with the at least one coordinator demand signal being determined according to the information concerning coordinator limitations and the intended driving demand 14. The method also includes outputting the at least one coordinator demand signal to at least one of the coordinator subsystems 16 and calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems 16, with the at least one actuator demand signal being determined according to the information concerning actuator limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems 16. The method further includes outputting the at least one actuator demand signal to the at least one actuator control subsystem 26. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem 26 to perform the vehicle

behavior modification of the intended driving demand 14 (see the present specification, paragraphs 22-25 and 41-48).

Yet another aspect of the present invention is to provide a vehicle control system comprising a vehicle motion control subsystem 12 having a control input and a control output, with the control input communicating an intended driving demand 14 to the vehicle motion control subsystem 12, and with the intended driving demand 14 requesting a vehicle behavior modification. The vehicle control system also includes a plurality of coordinator subsystems 16, with each coordinator subsystem 16 including a coordinator input and a coordinator output, and with each coordinator subsystem 16 communicating information concerning coordinator limitations of the coordinator subsystem 16 to the system input of the vehicle motion control subsystem 12. The vehicle control system further includes at least one actuator control subsystem 26 for each coordinator subsystem 16, with each actuator control subsystem 26 having an actuator output communicating actuator information concerning limitations of the actuator control subsystem 26 to the coordinator input of an associated one of the plurality of coordinator subsystems 16. The vehicle motion control subsystem 12 calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator information concerning limitations and the intended driving demand 14. The vehicle motion control subsystem 12 outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems 16. Each coordinator subsystem 16 calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator information concerning limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems 16. Each coordinator subsystem 16 outputs the at least one actuator demand signal to at least one actuator control subsystem 26. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem 26 to perform the vehicle behavior modification of the intended driving demand 14 (see the present specification, paragraphs 22-25 and 41-48).

Va. Cited Prior Art

U.S. Patent No. 5,794,735 to Sigl

The Sigl 5,794,735 patent discloses a method of vehicle deceleration by engine control followed by brake control. The control system (FIG. 1) as disclosed in the Sigl '735 patent includes a first control unit 10. The first control unit 10, via an output line 12, controls a device or devices 14 for controlling the engine output of an internal combustion engine for driving the vehicle.

An operating control element 44 is connected to the first control unit 10 through a line 48. The operating control element 44 "may be a cruise control element, as well as, possibly, a control element for activating the brake." Lines 50-52 of column 2 of the '735 patent. The operating control element 44 has available the functional positions for implementing the cruise control function, such as "accelerate", "decelerate", "set", "resume" and "off". In dependence upon the function desired by the driver, the control unit 10, through adjustment of the final controlling device 14, controls the speed of the vehicle to the value specified by the driver, or accelerates or decelerates the vehicle in accordance with the function specified by the driver via the operating control element 44.

The first control unit 10 can include a vehicle-speed limiter having a comparable function. In use, the driver stipulates a maximum speed via the operating control element 44. The driver also controls the engine output by actuating the gas pedal. If the vehicle speed exceeds the preset value, then the vehicle-speed limiter in the first control unit 10 reduces the engine output independently of the gas pedal actuation.

A second control unit 24 is also connected to the first control unit 10 through lines 38 and 40. The second control unit 24 influences the braking power of the vehicle by intervening in at least one control element 36 of a braking device. If the first control unit 10 cannot independently limit the speed of the vehicle by reducing engine output (e.g., when the vehicle is travelling downhill), the second control unit 24 reduces the speed of the vehicle through a braking action.

Vb. The Examiner's Rejection

Claims 1, 6-8, 13, 14, 15, 21 and 22 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,794,735 to Sigl.

VI. Issue

The issue is:

Issue: Whether claims 1, 6-8, 13, 14, 15, 21 and 22 are anticipated by U.S. Patent No. 5,794,735 to Sigl?

VII. Grouping of Claims

The claims are subdivided into the following groups for this appeal. The claims of each subdivided group are believed to be separately patentable since they define inventions of patentably different scopes and subject matter, as shown by the reasons given in the arguments below.

Claim 1 stands or falls alone (claim 1 is an independent claim).

Claim 6 stands or falls along.

Claim 7 stands or falls alone.

Claim 8 stands or falls alone (claim 8 is an independent claim).

Claim 13 stands or falls alone.

Claim 14 stands or falls alone.

Claim 15 stands or falls alone (claim 15 is an independent claim).

Claim 21 stands or falls alone (claim 21 is an independent claim).

Claim 22 stands or falls alone (claim 22 is an independent claim).

VIII. Arguments

Issue: Whether claims 1, 6-8, 13, 14, 15, 21 and 22 are anticipated by U.S. Patent No. 5,794,735 to Sigl?

Argument

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*" *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added). In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of anticipation based upon the prior art. *In re Sun*, 31 U.S.P.Q.2d 1451, 1453 (Fed. Cir. 1993) (unpublished). The Examiner has not created a prima facie case of anticipation to reject claims 1, 6-8, 13, 14, 15, 21 and 22.

Discussion

Claim 1 defines a method of controlling a vehicle including, among other things, inputting an intended driving demand to a vehicle motion control subsystem, with the intended driving demand requesting a vehicle behavior modification. The method also includes providing a plurality of coordinator subsystems and providing at least one actuator control subsystem for each coordinator subsystem. The method further includes outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems and outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem. Furthermore, the method includes calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand. The method also includes outputting the at least one coordinator demand signal to at least one of the coordinator subsystems. The method

further includes calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. Furthermore, the method includes outputting the at least one actuator demand signal to the at least one actuator control subsystem. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

According to the Final Office Action, the Sigl '735 patent discloses all of the features of claim 1 in Fig. 1 and columns 2-3. However, the Final Office Action does not say which specific element disclosed by the Sigl '735 patent anticipates the elements of claim 1 beyond asserting that each paragraph of claim 1 is covered by one of the above referenced portions of the Sigl '735 patent. While Applicants have requested the Examiner to define the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact as required by 37 C.F.R. §1.104(c)(2), the Examiner was not able to give a concrete example of the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact. Applicant notes that the Examiner is still required to show the presence in a single prior art reference disclosure of each and every element of the claimed invention as arranged as in the claim. *Lindemann Maschinenfabrik GmbH,* supra. Moreover, Applicants submit that the Examiner is not able to provide such an example because such an example does not exist. Nevertheless, Applicants submit that the Sigl '735 patent does not disclose all of the features of claim 1.

Specifically, claim 1 defines the method of controlling a vehicle as including (1) outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems, (2) outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem, (3) calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one

coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand, and (4) calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. As discussed above, it is difficult, if not impossible, to determine which elements of the Sigl '735 patent that the Examiner considers to be the at least one actuator control subsystem, the at least one coordinator subsystem and the vehicle motion control subsystem.

Nevertheless, no element illustrated in Fig. 1 or described in columns 2 or 3 of the Sigl '735 patent are disclosed as outputting capabilities of the element or as calculating a demand signal according to any capabilities of an element. In the Final Office Action, the Examiner apparently ignores or dismisses this all of these elements of claim 1 by stating:

> [I]t has been held that the recitation that an element is "capabilities" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Page 6 of the Final Office Action mailed December 19, 2003. However, the Examiner's rejection of claim 1 on the grounds cited above is improper on several grounds.

First, *In re Hutchison* does not state that a recitation that an element is "capable" of performing a function is not a positive limitation and only requires the ability to so perform when applied to method claims. *In re Hutchison* states that the use of language in a claim including "adapted for use" and "capable of being machined" in an article claim does not constitute a limitation in any patentable sense. However, claim 1 is a method claim and therefore *In re Hutchison* does not apply.

Second, in order for a claim to be anticipated under 35 U.S.C. §102, each and every element as set forth in the claim must be found in a single prior art reference. *Lindemann Maschinenfabrik GmbH,* supra; M.P.E.P. § 2131 (emphasis added). Therefore, the language in claim 1, even if functional, must be anticipated. Consequently, the language in claim 1 can not be ignored.

Third, the Examiner has not compared the facts in *In re Hutchison* and explain why, based upon this comparison, the legal conclusion in the present case should be the same as that in *In re Hutchison* as required by M.P.E.P. §2144. Instead, the Examiner has relied on a *per se* rule that any use of the term "capabilities" is not a positive limitation but only requires the ability to so perform and that it does not constitute a limitation in any patentable sense. However, it is clear that "reliance on *per se* rules of obviousness is legally incorrect and must cease." *In re Ochiai*, 37 U.S.P.Q.2d 1127, 1133 (Fed. Cir. 1995).

Finally, and most importantly, claim 1 does not state that the vehicle motion control subsystem, the at least one actuator control subsystem and the plurality of coordinator subsystems in columns are capable of performing some function. Instead, the use of the term "capabilities" in claim 1 refers to the information outputted or used to calculate signals. Applicants submit that in the present application the terms "coordinator capabilities" and "actuator capabilities" relate to information that is utilized by the vehicle motion control subsystem and the at least one coordinator subsystem to calculate a coordinator demand signal and an actuator demand signal, respectfully. The Sigl '735 patent does not disclose any element that outputs capabilities of the element or that calculates any signals determined according to the capabilities of any element.

Applicants note that the term "capabilities" is discussed extensively in the specification as filed, and numerous examples of coordinator subsystem capabilities and actuator control subsystems are provided. With reference to paragraph 36 of the present application, the control system of the present invention enhances the performance of the vehicle by distributing commands from the vehicle motion control subsystem 12 to the coordinator subsystems 16 based upon the physical capabilities of the actuator control subsystems 26. With reference to paragraph 38, the capabilities of each coordinator subsystem 16 are a combination of all of the capabilities of the actuator control subsystems 26 functionally located under each coordinator subsystem 16 as determined by the data of the vehicle state measurements and measurements from actuator state estimators communicating with each actuator control subsystem 26. For example, a first one of the coordinator subsystems 16 can be the drive train and brakes

coordinator subsystem 20 determining that it is capable of providing up to 3.0 Newton meters of braking wheel torque as measured by a combination of the braking wheel torque capabilities of the actuator control subsystems 26 communicating with the drive train and brake coordinator system 20. Although the drive train and brakes coordinator subsystem 20 is used in this example, the coordinator subsystem 16 in step 64 (Figs. 5A and 5B) could be any of the coordinator subsystems 16. The coordinator subsystems 16 output their capabilities to the vehicle motion control subsystem 12 at step 66. Paragraph 39 further describes how the capabilities of the coordinator subsystems 16 are utilized to control the vehicle. The vehicle motion control subsystem 12 preferably sends out demand signals that do not require the coordinator subsystem 16 to perform up to their full capabilities. The demand signals sent to each coordinator subsystem 16 depend on the capabilities of the coordinator subsystem 16 and/or the capabilities of the other coordinator subsystems 16. The demand signal sent to a first coordinator subsystem 16, when more than one demand signal is calculated, will depend on the demand signal sent to a second coordinator subsystem 16, which depends on the capabilities of second coordinator subsystem 16.

Various examples concerning specific capabilities are given in the specification. In addition to the braking wheel torque capability discussed above, paragraph 39 discusses the maximum Newton meters of yaw torque that the steering coordinator subsystem 18 is capable of. Paragraph 42 discusses another example in which a level and control subsystem 46 determines that it is capable of providing up to 3.0 Newtons of vertical force as determined by the load of the vehicle (a vehicle state measurement) and possible air input into an air-suspension level-control system (an actuator state measurement). As discussed in paragraph 43, after the actuator control subsystems 26 have determined their capabilities, each actuator control subsystem 26 will output a capability signal to the suspension coordinator subsystem 22 communicating the capabilities of each actuator control subsystem 26 at step 208 (Fig. 6). Paragraph 45 describes how the physical capabilities of the actuator control subsystem 26 are functionally located below the drive train and brakes coordinator subsystem 22. Paragraph 46 discusses an example wherein a first actuator control subsystem 26 is an engine control

subsystem 36 that determines it is capable of providing up to 3.0 Newton meters of wheel torque as determined by the speed of the vehicle (a vehicle state measurement) and fuel input into the engine (an actuator state measurement).

Therefore, the Sigl '735 does note disclose outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems, outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem, calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand, and calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems as claimed in claim 1.

Accordingly, Applicants submit that claim 1 is in condition for allowance.

Claims 6 and 7 depend from claim 1, and since claim 1 defines patentable subject matter as discussed above, claims 6 and 7 define patentable subject matter.

Furthermore, claim 6 depends from claim 1, and further defines the method of controlling a vehicle as including inputting actuator state measurements into the at least one actuator control subsystem, wherein the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements. The Sigl '735 patent does not disclose the above noted features of claim 6. Specifically, as discussed above, the Sigl '735 patent does not disclose determining actuator capabilities. Furthermore, the Sigl '735 patent does not disclose that the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements. Accordingly, claim 6 is in condition for allowance.

Claim 7 depends from claims 1 and 6, and further defines the method of controlling a vehicle by stating that the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one

actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems. The Sigl '735 patent does not disclose the above noted features of claim 7. Specifically, as discussed above, the Sigl '735 patent does not disclose determining coordinator capabilities, determining actuator capabilities or outputting actuator capabilities. Furthermore, the Sigl '735 patent does not disclose that the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems. Accordingly, claim 7 is in condition for allowance.

Claim 8 defines a vehicle control system including, among other things, a vehicle motion control subsystem having a control input and a control output, with the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification. The vehicle control system also includes a plurality of coordinator subsystems, with each coordinator subsystem including a coordinator input and a coordinator output, and with each coordinator subsystem communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem. The vehicle control system further includes at least one actuator control subsystem for each coordinator subsystem, with each actuator control subsystem having an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems. The vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand. The vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems. Each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. Each coordinator subsystem outputs the at least one

actuator demand signal to at least one actuator control subsystem. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

According to the Final Office Action, the Sigl '735 patent discloses all of the features of claim 8 in Fig. 1 and columns 2-3. However, the Final Office Action does not say which specific element disclosed by the Sigl '735 patent anticipates the elements of claim 8 beyond asserting that each paragraph of claim 8 is covered by one of the above referenced portions of the Sigl '735 patent. While Applicants have requested the Examiner to define the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact as required by 37 C.F.R. §1.104(c)(2), the Examiner was not able to give a concrete example of the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact. Applicant notes that the Examiner is still required to show the presence in a single prior art reference disclosure of each and every element of the claimed invention as arranged as in the claim. *Lindemann Maschinenfabrik GmbH,* supra. Moreover, Applicants submit that the Examiner is not able to provide such an example because such an example does not exist. Nevertheless, Applicants submit that the Sigl '735 patent does not disclose all of the features of claim 8.

Specifically, claim 8 defines the vehicle control system as stating that (1) each coordinator subsystem communicates coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem, (2) each actuator control subsystem has an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems, (3) the vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand, and (4) each coordinator subsystem calculates at least one actuator demand signal, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted

to the at least one of the coordinator subsystems. As discussed above, it is difficult, if not impossible, to determine which elements of the Sigl '735 patent that the Examiner considers to be the at least one actuator control subsystem, the at least one coordinator subsystem and the vehicle motion control subsystem.

Nevertheless, no element illustrated in Fig. 1 or described in columns 2 or 3 of the Sigl '735 patent are disclosed as communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem, communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems, calculating at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand, or calculating at least one actuator demand signal, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. In the Final Office Action, the Examiner apparently ignores or dismisses this all of these elements of claim 8 by stating:

> [I]t has been held that the recitation that an element is "capabilities" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

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Second, the Examiner has not compared the facts in *In re Hutchison* and explain why, based upon this comparison, the legal conclusion in the present case should be the same as that in *In re Hutchison* as required by M.P.E.P. §2144. Instead, the Examiner has relied on a *per*

se rule that any use of the term "capabilities" is not a positive limitation but only requires the ability to so perform and that it does not constitute a limitation in any patentable sense. However, it is clear that "reliance on *per se* rules of obviousness is legally incorrect and must cease." *In re Ochiai*, 37 U.S.P.Q.2d 1127, 1133 (Fed. Cir. 1995).

Finally, and most importantly, claim 8 does not state that the vehicle motion control subsystem, the at least one actuator control subsystem and the plurality of coordinator subsystems in columns are capable of performing some function. Instead, the use of the term "capabilities" in claim 8 refers to information communicated or used to calculate signals. Applicants submit that in the present application the terms "coordinator capabilities" and "actuator capabilities" relate to information that is utilized by the vehicle motion control subsystem and the at least one coordinator subsystem to calculate a coordinator demand signal and an actuator demand signal, respectfully. The Sigl '735 patent does not disclose any element that communicates capabilities of the element or that calculates any signals determined according to the capabilities of any element.

Applicants note that the term "capabilities" is discussed extensively in the specification as filed, and numerous examples of coordinator subsystem capabilities and actuator control subsystems are provided. With reference to paragraph 36 of the present application, the control system of the present invention enhances the performance of the vehicle by distributing commands from the vehicle motion control subsystem 12 to the coordinator subsystems 16 based upon the physical capabilities of the actuator control subsystems 26. With reference to paragraph 38, the capabilities of each coordinator subsystem 16 are a combination of all of the capabilities of the actuator control subsystems 26 functionally located under each coordinator subsystem 16 as determined by the data of the vehicle state measurements and measurements from actuator state estimators communicating with each actuator control subsystem 26. For example, a first one of the coordinator subsystems 16 can be the drive train and brakes coordinator subsystem 20 determining that it is capable of providing up to 3.0 Newton meters of braking wheel torque as measured by a combination of the braking wheel torque capabilities of the actuator control subsystems 26 communicating with the drive train and brake

coordinator system 20. Although the drive train and brakes coordinator subsystem 20 is used in this example, the coordinator subsystem 16 in step 64 (Figs. 5A and 5B) could be any of the coordinator subsystems 16. The coordinator subsystems 16 output their capabilities to the vehicle motion control subsystem 12 at step 66. Paragraph 39 further describes how the capabilities of the coordinator subsystems 16 are utilized to control the vehicle. The vehicle motion control subsystem 12 preferably sends out demand signals that do not require the coordinator subsystem 16 to perform up to their full capabilities. The demand signals sent to each coordinator subsystem 16 depend on the capabilities of the coordinator subsystem 16 and/or the capabilities of the other coordinator subsystems 16. The demand signal sent to a first coordinator subsystem 16, when more than one demand signal is calculated, will depend on the demand signal sent to a second coordinator subsystem 16, which depends on the capabilities of second coordinator subsystem 16.

Various examples concerning specific capabilities are given in the specification. In addition to the braking wheel torque capability discussed above, paragraph 39 discusses the maximum Newton meters of yaw torque that the steering coordinator subsystem 18 is capable of. Paragraph 42 discusses another example in which a level and control subsystem 46 determines that it is capable of providing up to 3.0 Newtons of vertical force as determined by the load of the vehicle (a vehicle state measurement) and possible air input into an air-suspension level-control system (an actuator state measurement). As discussed in paragraph 43, after the actuator control subsystems 26 have determined their capabilities, each actuator control subsystem 26 will output a capability signal to the suspension coordinator subsystem 22 communicating the capabilities of each actuator control subsystem 26 at step 208 (Fig. 6). Paragraph 45 describes how the physical capabilities of the actuator control subsystem 26 are functionally located below the drive train and brakes coordinator subsystem 22. Paragraph 46 discusses an example wherein a first actuator control subsystem 26 is an engine control subsystem 36 that determines it is capable of providing up to 3.0 Newton meters of wheel torque as determined by the speed of the vehicle (a vehicle state measurement) and fuel input into the engine (an actuator state measurement).

Therefore, the Sigl '735 does note disclose that each coordinator subsystem communicates coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem, each actuator control subsystem has an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems, the vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand, or each coordinator subsystem calculates at least one actuator demand signal, with the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems as claimed in claim 8.

Accordingly, Applicants submit that claim 8 is in condition for allowance.

Claims 13 and 14 depend from claim 8, and since claim 8 defines patentable subject matter as discussed above, claims 13 and 14 define patentable subject matter.

Furthermore, claim 13 depends from claim 8, and further defines the vehicle control system by stating that actuator state measurements are input into the at least one actuator control subsystem, and the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements. The Sigl '735 patent does not disclose the above noted features of claim 13. Specifically, as discussed above, the Sigl '735 patent does not disclose determining actuator capabilities. Furthermore, the Sigl '735 patent does not disclose that the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements. Accordingly, claim 13 is in condition for allowance.

Moreover, claim 14 depends from claims 1 and 13, and further defines the vehicle control system by stating that the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems. The Sigl '735 patent does not disclose the above noted

features of claim 14. Specifically, as discussed above, the Sigl '735 patent does not disclose coordinator capabilities or determining actuator capabilities. Furthermore, the Sigl '735 patent does not disclose that the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems. Accordingly, claim 14 is in condition for allowance.

Claim 15 defines a method of controlling a vehicle including, among other things, receiving at least one driver input from a driver of the vehicle and providing at least one active assist program having at least one active input, with the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input. The method further includes inputting an intended driving demand for implementing a vehicle behavior modification into a vehicle motion control subsystem, proving an implementation subsystem, and outputting at least a portion of the intended driving demand from the vehicle motion control subsystem to the implementation subsystem. The intended driving demand is derived from a combination of the at least one driver input and the at least one active input if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program, otherwise the intended driving demand is derived from the at least one driver input.

The prior art of record does not disclose or suggest the above noted features of claim 15. Specifically, the Sigl '735 patent does not disclose an intended driving demand derived from a combination of at least one driver input and at least one active input if an at least one active assist program is in an on setting and if the driver of the vehicle does not overrule the at least one active assist program, otherwise the intended driving demand is derived from the at least one driver input. According to claim 15, the intended driving demand can only be derived from (1) a combination of the at least one driver input and the at least one active input, if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program or (2) the at least one driver input.

However, the Sigl '735 patent discloses directions to the device 14 wherein the operating control element 44 overrules the signal in the output line 12 even if the driver controls the engine output by actuating the gas pedal above the maximum speed set by the operating control element 44. Therefore, in this situation, any active assist program is in the on setting and the driver of the vehicle overrules the at least one active assist program. However, in this situation, any intended driving demand is not derived from at least one driver input. The intended driving demand is derived from the single output of the operating control element 44. Accordingly, claim 15 is in condition for allowance.

Claim 21 defines a method of controlling a vehicle including, among other things, inputting an intended driving demand to a vehicle motion control subsystem, with the intended driving demand requesting a vehicle behavior modification. The method also includes providing a plurality of coordinator subsystems and providing at least one actuator control subsystem for each coordinator subsystem. The method further includes outputting information concerning actuator limitations of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems and outputting information concerning coordinator limitations of each coordinator subsystem to the vehicle motion control subsystem. Furthermore, the method includes calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one coordinator demand signal being determined according to the information concerning coordinator limitations and the intended driving demand. The method also includes outputting the at least one coordinator demand signal to at least one of the coordinator subsystems and calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the information concerning actuator limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. The method further includes outputting the at least one actuator demand signal to the at least one actuator control subsystem. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

According to the Final Office Action, the Sigl '735 patent discloses all of the features of claim 21 in Fig. 1 and columns 2-3. However, the Final Office Action does not say which specific element disclosed by the Sigl '735 patent anticipates the elements of claim 21 beyond asserting that each paragraph of claim 21 is covered by one of the above referenced portions of the Sigl '735 patent. While Applicants have requested the Examiner to define the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact as required by 37 C.F.R. §1.104(c)(2), the Examiner was not able to give a concrete example of the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact. Applicant notes that the Examiner is still required to show the presence in a single prior art reference disclosure of each and every element of the claimed invention as arranged as in the claim. *Lindemann Maschinenfabrik GmbH,* supra. Moreover, Applicants submit that the Examiner is not able to provide such an example because such an example does not exist. Nevertheless, Applicants submit that the Sigl '735 patent does not disclose all of the features of claim 21.

Specifically, claim 21 defines the method of controlling a vehicle as including (1) outputting information concerning actuator limitations of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems, (2) outputting information concerning coordinator limitations of each coordinator subsystem to the vehicle motion control subsystem, (3) calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one coordinator demand signal being determined according to the information concerning coordinator limitations and the intended driving demand and (4) calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the information concerning actuator limitations. As discussed above, it is difficult, if not impossible, to determine which elements of the Sigl '735 patent that the Examiner considers to be the at least one actuator control subsystem, the coordinator subsystems and the vehicle motion control subsystem.

Nevertheless, no element illustrated in Fig. 1 or described in columns 2 or 3 of the Sigl '735 patent are disclosed as outputting information concerning limitations of the element or as calculating a demand signal according to any information concerning limitations of an element. In the Final Office Action, the Examiner apparently ignores or dismisses this all of these elements of claim 21 by stating:

> [I]t has been held that the recitation that an element is "capabilities" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Page 6 of the Final Office Action mailed December 19, 2003. However, the Examiner's rejection of claim 21 on the grounds cited above is improper on several grounds.

First, *In re Hutchison* does not state that a recitation that an element is "capable" of performing a function is not a positive limitation and only requires the ability to so perform when applied to method claims. *In re Hutchison* states that the use of language in a claim including "adapted for use" and "capable of being machined" in an article claim does not constitute a limitation in any patentable sense. However, claim 21 is a method claim and therefore *In re Hutchison* does not apply.

Second, in order for a claim to be anticipated under 35 U.S.C. §102, each and every element as set forth in the claim must be found in a single prior art reference. *Lindemann Maschinenfabrik GmbH,* supra; M.P.E.P. § 2131 (emphasis added). Therefore, the language in claim 21, even if functional, must be anticipated. Consequently, the language in claim 21 can not be ignored.

Third, the Examiner has not compared the facts in *In re Hutchison* and explain why, based upon this comparison, the legal conclusion in the present case should be the same as that in *In re Hutchison* as required by M.P.E.P. §2144. Instead, the Examiner has relied on a *per se* rule that any use of the term "capabilities" is not a positive limitation but only requires the ability to so perform and that it does not constitute a limitation in any patentable sense. However, it is clear that "reliance on *per se* rules of obviousness is legally incorrect and must cease." *In re Ochiai*, 37 U.S.P.Q.2d 1127, 1133 (Fed. Cir. 1995).

Finally, and most importantly, claim 21 does not include the term "capabilities." Therefore, the rejection set forth by the Examiner does not apply to claim 21. Nevertheless, the Sigl '735 patent does not disclose (1) outputting information concerning actuator limitations of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems, (2) outputting information concerning coordinator limitations of each coordinator subsystem to the vehicle motion control subsystem, (3) calculating at least one coordinator demand signal with the vehicle motion control subsystem, with the at least one coordinator demand signal being determined according to the information concerning coordinator limitations and the intended driving demand and (4) calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, with the at least one actuator demand signal being determined according to the information concerning actuator limitations.

Accordingly, claim 21 is in condition for allowance.

Claim 22 defines a vehicle control system including, among other things, a vehicle motion control subsystem having a control input and a control output, with the control input communicating an intended driving demand to the vehicle motion control subsystem, and with the intended driving demand requesting a vehicle behavior modification. The vehicle control system also includes a plurality of coordinator subsystems, with each coordinator subsystem including a coordinator input and a coordinator output, and with each coordinator subsystem communicating information concerning coordinator limitations of the coordinator subsystem to the system input of the vehicle motion control subsystem. The vehicle control system further includes at least one actuator control subsystem for each coordinator subsystem, with each actuator control subsystem having an actuator output communicating actuator information concerning limitations of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems. The vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator information concerning limitations and the intended driving demand. The vehicle motion control subsystem outputs

the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems. Each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator information concerning limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. Each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem. A combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

According to the Final Office Action, the Sigl '735 patent discloses all of the features of claim 22 in Fig. 1 and columns 2-3. However, the Final Office Action does not say which specific element disclosed by the Sigl '735 patent anticipates the elements of claim 22 beyond asserting that each paragraph of claim 22 is covered by one of the above referenced portions of the Sigl '735 patent. While Applicants have requested the Examiner to define the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact as required by 37 C.F.R. §1.104(c)(2), the Examiner was not able to give a concrete example of the particular part as disclosed in the Sigl '735 patent used to reject the elements of the claims and clearly explain how the parts of the Sigl '735 patent interact. Applicant notes that the Examiner is still required to show the presence in a single prior art reference disclosure of each and every element of the claimed invention as arranged as in the claim. *Lindemann Maschinenfabrik GmbH,* supra. Moreover, Applicants submit that the Examiner is not able to provide such an example because such an example does not exist. Nevertheless, Applicants submit that the Sigl '735 patent does not disclose all of the features of claim 22.

Specifically, claim 22 defines the vehicle control system by stating that (1) each coordinator subsystem communicates information concerning coordinator limitations of the coordinator subsystem to the system input of the vehicle motion control subsystem, (2) each actuator control subsystem has an actuator output communicating actuator information concerning limitations of the actuator control subsystem to the coordinator input of an

associated one of the plurality of coordinator subsystems, (3) the vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator information concerning limitations and the intended driving demand, and (4) each coordinator subsystem calculates at least one actuator demand signal, with the at least one actuator demand signal being determined according to the actuator information concerning limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems. As discussed above, it is difficult, if not impossible, to determine which elements of the Sigl '735 patent that the Examiner considers to be the at least one actuator control subsystem, the coordinator subsystems and the vehicle motion control subsystem.

Nevertheless, no element illustrated in Fig. 1 or described in columns 2 or 3 of the Sigl '735 patent are disclosed as outputting information concerning limitations of the element or as calculating a demand signal according to any information concerning limitations of an element. In the Final Office Action, the Examiner apparently ignores or dismisses this all of these elements of claim 22 by stating:

> [I]t has been held that the recitation that an element is "capabilities" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Page 6 of the Final Office Action mailed December 19, 2003. However, the Examiner's rejection of claim 22 on the grounds cited above is improper on several grounds.

First, in order for a claim to be anticipated under 35 U.S.C. §102, each and every element as set forth in the claim must be found in a single prior art reference. *Lindemann Maschinenfabrik GmbH,* supra; M.P.E.P. § 2131 (emphasis added). Therefore, the language in claim 22, even if functional, must be anticipated. Consequently, the language in claim 22 can not be ignored.

Second, the Examiner has not compared the facts in *In re Hutchison* and explain why, based upon this comparison, the legal conclusion in the present case should be the same as that in *In re Hutchison* as required by M.P.E.P. §2144. Instead, the Examiner has relied on a *per*

se rule that any use of the term "capabilities" is not a positive limitation but only requires the ability to so perform and that it does not constitute a limitation in any patentable sense. However, it is clear that "reliance on *per se* rules of obviousness is legally incorrect and must cease." *In re Ochiai*, 37 U.S.P.Q.2d 1127, 1133 (Fed. Cir. 1995).

Finally, and most importantly, claim 22 does not include the term "capabilities." Therefore, the rejection set forth by the Examiner does not apply to claim 22. Nevertheless, the Sigl '735 patent does not disclose (1) each coordinator subsystem communicates information concerning coordinator limitations of the coordinator subsystem to the system input of the vehicle motion control subsystem, (2) each actuator control subsystem has an actuator output communicating actuator information concerning limitations of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems, (3) the vehicle motion control subsystem calculates at least one coordinator demand signal, with the at least one coordinator demand signal being determined according to the coordinator information concerning limitations and the intended driving demand, and (4) each coordinator subsystem calculates at least one actuator demand signal, with the at least one actuator demand signal being determined according to the actuator information concerning limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems.

Accordingly, claim 22 is in condition for allowance.

Therefore, claims 1, 6-8, 13, 14, 15, 21 and 22 are allowable over the Sigl '735 patent, and the Board is requested to reverse the rejection of these claims.

IX. Conclusion

Each appealed claim recites features that are not disclosed by any of the cited references and it would not have been obvious to modify the cited references to include the recited features of the appealed claims. The reference upon which the Examiner relies in the Examiner's rejections of the finally rejected claims does not disclose or suggest (1) outputting or communication capabilities or information concerning limitation of any element, or (2) an

intended driving demand can only be derived from (a) a combination of the at least one driver input and the at least one active input, if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program or (b) the at least one driver input. Applicant's invention resolves problems and inconveniences experienced in the prior art, and therefore represents a significant advancement in the art. Applicant earnestly requests that the Examiner's final rejection of claims 1, 6-8, 13, 14, 15, 21 and 22, inclusive, be reversed, and that the application be passed to issuance forthwith.

Respectfully submitted,

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Appendix of Claims (37 CFR §1.192(c)(9))

1. A method of controlling a vehicle comprising:

inputting an intended driving demand to a vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

providing a plurality of coordinator subsystems;

providing at least one actuator control subsystem for each coordinator subsystem;

outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems; and

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

2. A method of controlling a vehicle comprising:

inputting an intended driving demand to a vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

providing a plurality of coordinator subsystems;

providing at least one actuator control subsystem for each coordinator subsystem;

outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

receiving at least one driver input from a driver of the vehicle;

providing at least one active assist program having at least one active input, the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input; and

receiving at least one active input from the at least one active assist program if the at least one active assist program is in the on setting;

wherein a combination of the at least one driver input and the at least one active input define the intended driving demand if the at least one active assist program is in the on setting and if the driver of the vehicle does not override the at least one active assist program; and

wherein the at least one driver input defines the intended driving demand if the at least one active assist program is in the off setting or the driver of the vehicle overrides the at least one active assist program.

3. The method of controlling a vehicle of claim 2, further including:

inputting environmental data into the at least one active assist program.

4. A method of controlling a vehicle comprising:

inputting an intended driving demand to a vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

providing a plurality of coordinator subsystems;

providing at least one actuator control subsystem for each coordinator subsystem;

outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems; and

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

wherein the plurality of coordinator subsystems include a suspension coordinator subsystem, a steering coordinator subsystem and a drive train and brakes coordinator subsystem.

5. A method of controlling a vehicle comprising:

inputting an intended driving demand to a vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

providing a plurality of coordinator subsystems;

providing at least one actuator control subsystem for each coordinator subsystem;

outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems; and

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

wherein the at least one coordinator demand signal comprises a plurality of coordinator demand signals.

6. The method of controlling a vehicle of claim 1, further including:

inputting actuator state measurements into the at least one actuator control subsystem;

wherein the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements.

7. The method of controlling a vehicle of claim 6, wherein:

the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems.

8. A vehicle control system comprising:

a vehicle motion control subsystem having a control input and a control output, the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

a plurality of coordinator subsystems, each coordinator subsystem including a coordinator input and a coordinator output, each coordinator subsystem communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem; and

at least one actuator control subsystem for each coordinator subsystem, each actuator control subsystem having an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems;

wherein the vehicle motion control subsystem calculates at least one coordinator demand signal, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

wherein the vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems;

wherein each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

wherein each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem; and

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

9. A vehicle control system comprising:

a vehicle motion control subsystem having a control input and a control output, the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

a plurality of coordinator subsystems, each coordinator subsystem including a coordinator input and a coordinator output, each coordinator subsystem communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem; and

at least one actuator control subsystem for each coordinator subsystem, each actuator control subsystem having an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems;

wherein the vehicle motion control subsystem calculates at least one coordinator demand signal, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

wherein the vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems;

wherein each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

wherein each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem; and

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

a driver subsystem for receiving inputs from a driver of the vehicle; and

at least one active assist program having at least one active input, the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input;

wherein a combination of the at least one driver input and the at least one active input define the intended driving demand if the at least one active assist program is in the on setting and if the driver of the vehicle does not override the at least one active assist program; and

wherein the at least one driver input defines the intended driving demand if the at least one active assist program is in the off setting or the driver of the vehicle overrides the at least one active assist program.

10. The vehicle control system of claim 9, wherein:

the at least one active assist program receives environmental data.

11. A vehicle control system comprising:

a vehicle motion control subsystem having a control input and a control output, the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

a plurality of coordinator subsystems, each coordinator subsystem including a coordinator input and a coordinator output, each coordinator subsystem communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem; and

at least one actuator control subsystem for each coordinator subsystem, each actuator control subsystem having an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems;

wherein the vehicle motion control subsystem calculates at least one coordinator demand signal, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

wherein the vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems;

wherein each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

wherein each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

wherein the plurality of coordinator subsystems include a suspension coordinator subsystem, a steering coordinator subsystem and a drive train and brakes coordinator subsystem.

12. A vehicle control system comprising:

a vehicle motion control subsystem having a control input and a control output, the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

a plurality of coordinator subsystems, each coordinator subsystem including a coordinator input and a coordinator output, each coordinator subsystem communicating coordinator capabilities of the coordinator subsystem to the system input of the vehicle motion control subsystem; and

at least one actuator control subsystem for each coordinator subsystem, each actuator control subsystem having an actuator output communicating actuator capabilities of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems;

wherein the vehicle motion control subsystem calculates at least one coordinator demand signal, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

wherein the vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems;

wherein each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator capabilities and

the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

wherein each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand; and

wherein the at least one coordinator demand signal comprises a plurality of coordinator demand signals.

13. The vehicle control system of claim 8, wherein:

actuator state measurements are input into the at least one actuator control subsystem; and

the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements.

14. The vehicle control system of claim 13, wherein:

the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems.

15. A method of controlling a vehicle comprising:

receiving at least one driver input from a driver of the vehicle;

providing at least one active assist program having at least one active input, the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input;

inputting an intended driving demand for implementing a vehicle behavior modification into a vehicle motion control subsystem;

proving an implementation subsystem; and

outputting at least a portion of the intended driving demand from the vehicle motion control subsystem to the implementation subsystem;

wherein the intended driving demand is derived from a combination of the at least one driver input and the at least one active input if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program, otherwise the intended driving demand is derived from the at least one driver input.

16. A method of controlling a vehicle comprising:

receiving at least one driver input from a driver of the vehicle;

providing at least one active assist program having at least one active input, the at least one active assist program having an on setting wherein the at least one active assist program outputs at least one active input and an off setting wherein the at least one active assist program does not output at least one active input;

inputting an intended driving demand for implementing a vehicle behavior modification into a vehicle motion control subsystem;

proving an implementation subsystem; and

outputting at least a portion of the intended driving demand from the vehicle motion control subsystem to the implementation subsystem;

wherein the intended driving demand is derived from a combination of the at least one driver input and the at least one active input if the at least one active assist program is in the on setting and if the driver of the vehicle does not overrule the at least one active assist program, otherwise the intended driving demand is derived from the at least one driver input;

wherein the implementation subsystem includes a plurality coordinator subsystems and at least one actuator control subsystem for each coordinator subsystem; and

further including the steps of:

outputting actuator capabilities of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting coordinator capabilities of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the coordinator capabilities and the intended driving demand;

the step of outputting at least a portion of the intended driving demand includes outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to the actuator capabilities and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystem; and

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein the at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

17. The method of controlling a vehicle of claim 16, further including:

inputting actuator state measurements into the at least one actuator control subsystem;

wherein the actuator capabilities of the at least one actuator control subsystem are determined according to the actuator state measurements.

18. The method of controlling a vehicle of claim 17, wherein:

the coordinator capabilities for the associated one of the plurality of coordinator subsystems are determined according to the actuator capabilities of the at least one actuator

control subsystem outputting the actuator capabilities to the associated one of the plurality of coordinator subsystems.

19. The method of controlling a vehicle of claim 16, wherein:

the plurality of coordinator subsystems include a suspension coordinator subsystem, a steering coordinator subsystem and a drive train and brakes coordinator subsystem.

20. The method of controlling a vehicle of claim 16, further including:

the at least one coordinator demand signal comprises a plurality of coordinator demand signals.

21. A method of controlling a vehicle comprising:

inputting an intended driving demand to a vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

providing a plurality of coordinator subsystems;

providing at least one actuator control subsystem for each coordinator subsystem;

outputting information concerning actuator limitations of the at least one actuator control subsystem to an associated one of the plurality of coordinator subsystems;

outputting information concerning coordinator limitations of each coordinator subsystem to the vehicle motion control subsystem;

calculating at least one coordinator demand signal with the vehicle motion control subsystem, the at least one coordinator demand signal being determined according to the information concerning coordinator limitations and the intended driving demand;

outputting the at least one coordinator demand signal to at least one of the coordinator subsystems;

calculating at least one actuator demand signal with each of the at least one of the coordinator subsystems, the at least one actuator demand signal being determined according to

the information concerning actuator limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems; and

outputting the at least one actuator demand signal to the at least one actuator control subsystem;

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.

22. A vehicle control system comprising:

a vehicle motion control subsystem having a control input and a control output, the control input communicating an intended driving demand to the vehicle motion control subsystem, the intended driving demand requesting a vehicle behavior modification;

a plurality of coordinator subsystems, each coordinator subsystem including a coordinator input and a coordinator output, each coordinator subsystem communicating information concerning coordinator limitations of the coordinator subsystem to the system input of the vehicle motion control subsystem; and

at least one actuator control subsystem for each coordinator subsystem, each actuator control subsystem having an actuator output communicating actuator information concerning limitations of the actuator control subsystem to the coordinator input of an associated one of the plurality of coordinator subsystems;

wherein the vehicle motion control subsystem calculates at least one coordinator demand signal, the at least one coordinator demand signal being determined according to the coordinator information concerning limitations and the intended driving demand;

wherein the vehicle motion control subsystem outputs the at least one coordinator demand signal to the coordinator input of at least one of the coordinator subsystems;

wherein each coordinator subsystem calculates at least one actuator demand signal, the at least one actuator demand signal being determined according to the actuator information

concerning limitations and the at least one coordinator demand signal outputted to the at least one of the coordinator subsystems;

wherein each coordinator subsystem outputs the at least one actuator demand signal to at least one actuator control subsystem; and

wherein a combination of each at least one actuator demand signal provides directions for the at least one actuator control subsystem to perform the vehicle behavior modification of the intended driving demand.